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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/770,289	01/29/2001	Atsushi Shiota	202450US0	6290

22850 7590 02/28/2002

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EXAMINER	
FEELY, MICHAEL J	

ART UNIT	PAPER NUMBER
1712	4

DATE MAILED: 02/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/770,289	SHIOTA ET AL.	
	Examiner	Art Unit	
	Michael J Feely	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☒ Claim(s) *3* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

[illegible] as been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

[illegible]

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

2. Claim 3 is objected to because of the following informalities: "Is" should be replaced with – is – . Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Regarding claims 1-2, 4-7, and 9-15, Treadwell et al. disclose a process for producing a silica-based film which comprises irradiating a film comprising at least one siloxane compound with electron beams (column 2, lines 19-62) to thereby convert the film into a film having a dielectric constant of 3 or lower (column 4, lines 44-46), wherein the silica-based film has a dielectric constant of 2.8 or lower (column 4, lines 44-46), wherein the film comprising a siloxane compound is an organic silica film (column 4, lines 25-34), wherein the film comprising a siloxane compound has a thickness of from 0.05 to 3 μm (column 5, lines 48-53), wherein the electron beam irradiation is conducted at an energy of from 0.1 to 50 keV in an irradiation dose of from 1 to 1,000 uC/cm^2 (column 7, lines 22-24), wherein the electron beam irradiation is conducted at 25 to 500°C (column 7, lines 19-22), wherein the electron beam irradiation is conducted in an inert gas atmosphere (column 7, lines 36-40), wherein the electron beam irradiation is conducted at 133.3 Pa or lower (column 7, lines 19-22), wherein the film comprising a siloxane compound is heat-cured at 300 to 500°C before being subjected to the electron beam irradiation (column 7, lines 46-54), a silica-based film obtained by the process according to claim 1 (column 2, lines 19-62; column 4, lines 44-46), which has a carbon content of from 5 to 17% by mole (column 2, lines 20-34), a low-dielectric film comprising the silica-based film as claimed in claim 12 (column 4, lines 44-46), and a semiconductor device having the low-dielectric film as claimed in claim 14 (column 2, lines 60-62).

Treadwell et al. do not explicitly disclose the process wherein the siloxane is converted to

ordering of atoms within the siloxane film. This inherent characteristic is supported by the

disclosure of Treadwell et al., wherein all the process limitations claimed by the Applicant are disclosed in the reference.

Therefore, if not explicitly taught in the reference, then the teachings would have been obvious to one of ordinary skill in the art at the time of the invention.

Regarding claim 3, Applicant uses the following product-by-process language to limit the siloxane film within the process claim: "wherein the siloxane compound *is a product of the hydrolysis and/or condensation of at least one compound selected from the group consisting of* compounds represented by the following formula (1): $R^1_aSi(OR^2)_{4-a}$ wherein R^1 represents a monovalent organic group or a hydrogen atom; R^2 represents a monovalent organic group; and a *is* an integer of 0 to 2, and compounds represented by the following formula (2): $R^3_b(R^4O)_{3-b}Si-(R^7)_d-Si(OR^5)_{3-c}R^6_c$ wherein R^3, R^4, R^5, and R^6 may be the same or different and each represents a monovalent organic group; b and c may be the same or different and each is an integer of 0 to 2; R^7 represents an oxygen atom or a group represented by $-(CH_2)_n-$, wherein n is 1 to 6; and d is 0 or 1."

Treadwell et al. (US Pat. No. 6,177,143) disclose, "Polymers of structures I and II may be prepared by mixing a solution of at least on organotrihalosilane and hydridotrihalosilane to from a mixture; combining the mixture with a dual phase solvent which includes both a non-polar solvent and a polar solvent; adding a catalyst to the dual phase solvent and trihalosilane mixture, thus providing a dual phase reaction mixture; reacting the dual phase reaction to produce an organohydridosiloxane [illegible]

been an equivalent to the "product of complete hydrolysis and condensation" set forth by the Applicant (see Specification page 13, lines 6-15).

It is noted that the limitation of claim 3 is a product-by-process limitation because it fails to disclose process steps in a manner that further limits the claimed invention. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process" In re Thorpe, 777 F. 2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Since the siloxane compound of Treadwell et al. is similar to that of the Applicants, the disclosure of Treadwell et al. anticipates or obviously reads on the limitation of the present claimed invention.

Therefore, if not explicitly taught in the reference, then the teachings would have been obvious to one of ordinary skill in the art at the time of the invention.

Claim Rejections - 35 USC § 103

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Treadwell et al. (US Pat. No. 6,177,143).

Regarding claim 8, Treadwell et al. are silent regarding the process as claimed in claim 1, wherein the electron beam irradiation is conducted in an atmosphere having an oxygen concentration of 10,000 ppm or lower

may be nitrogen, argon, oxygen, or any combination of these gases." (column 7, lines 36-39).

Applicant fails to show criticality of this range, and it has been found that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation – In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Therefore, if not explicitly taught in the reference, then the teachings would have been obvious to one of ordinary skill in the art at the time of the invention.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Livesay et al. (US Pat. No. 6,132,814) discloses a method of curing spin-on-glass film on a semiconductor by exposure to electron beams.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J Feely whose telephone number is 703-305-0268. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Dawson can be reached on 703-308-2340. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Michael J. Feely
February 20, 2002

Robert A. Dawson